

Claims

1. Device for processing samples of blood products contained in tubes closed by means of bungs and loaded into cassettes, of the type incorporating means of agitation capable of agitating the tubes, together with means of
5 sampling capable of collecting at least one sample from a pre-agitated tube,

characterised in that it includes transfer means (10) designed to move the cassettes (12) individually on a pre-determined path, and in that the means of agitation (30) incorporate at least one pick-up mechanism (32) designed to
10 pick up at least one selected tube (18) from a cassette (12) immobilised on the path, to remove said tube away from the cassette, to agitate the tube and to replace it in the cassette, and in that the sampling means (34) include at least one needle (148) designed to draw a given sample quantity from the tube that has been pre-agitated and replaced in the cassette.

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2. Device according to claim 1, characterised in that the means of transfer (10) include a carriage (60) capable of being attached to a cassette (12) via a retractable finger (66), and means of transfer (64, 68) capable of moving the carriage between defined positions on the path.

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3. Device according to claims 1 and 2, characterised in that the tubes (18) are placed vertically in the cassette (12) and in line with the direction of travel, and in that the means of agitation (30) are arranged to withdraw at least one tube (18) laterally from the cassette and to replace it laterally into
25 the cassette after agitation.

4. Device according to claims 1 to 3, characterised in that the cassette (12) incorporates flexible U-clips (44) allowing the removal and replacement of a tube by a lateral movement parallel to itself or by an axial movement of
30 the tube along the axis of the latter.

5. Device according to any of claims 1 to 4, characterised in that the pick-up mechanism (32) or each such mechanism is capable of being driven

in continuous rotation by a motor (88), thereby effecting continuous agitation by turning the tube through a complete revolution.

6. Device according to any of claims 1 to 5, characterised in that the means of agitation (30) incorporate a mobile head (100) carrying the pick-up mechanism(s) (32) and which is capable of being driven in linear or rotational motion by means of a coupling arrangement (96) connected to a motor (88) with two directions of rotation.

7. Device according to claim 6, characterised in that the coupling arrangement (96) includes a screw (92) and nut (94) and is capable of being driven in rotation by the motor (88) in a selective manner, operating the screw either to move the mobile head (100) away from the cassette (12) or to bring the mobile head (100) closer to the cassette (12), the mobile head being prevented from rotating and fixed in a selected orientation by locking means (132, 133) set in a locking position.

8. Device according to claim 7, characterised in that the locking means (132, 133) are capable of being set in a release position when the coupling arrangement (96) has arrived at a stop position at the end of the screw-in motion, thereby enabling a rotational movement of the mobile head (100) to agitate the tube(s).

9. Device according to any of claims 6 to 8, characterised in that the rotational movement of the mobile head (100) is a continuous and complete rotation in the direction of the screw-in action of the coupling arrangement (96).

10. Device according to any of claims 6 to 9, characterised in that it includes an arrangement for opening and closing the pick-up mechanism (32) which is capable of being actuated in a translational motion by the coupling arrangement (96) once the latter has arrived at a stop position at the end of the screw-out motion, with the mobile head (100) being prevented from rotating by the locking means (132, 133).

11. Device according to claim 10, characterised in that the pick-up mechanism (32) includes two clamp elements (114), each of which has at least one jaw (116) and defines a cam groove (120), together with a resilient return device (130) connecting the two clamp elements to bring the jaws
5 towards each other, and in that the opening and closing mechanism incorporates cam fingers (122) moved by the coupling arrangement (96) and cooperating respectively with the cam grooves (120).

12. Device according to any of claims 1 to 11, characterised in that it
10 includes a means of manual loading (82) placed in proximity to the transfer means (10) and designed to hold at least one tube (18) and to place this tube in the path of the transfer means and sampling means, when no cassette is present, to enable the collection of a sample by the sampling means (34).

13. Device according to claim 12, characterised in that the means of
15 manual loading (82) includes a rotating and tilting head (142) having indexed positions and incorporating slots (144) designed to accommodate tubes of different sizes.

14. Device according to any of claims 1 to 13, characterised in that the
20 sampling means (34) include a carriage (146) supporting the piercing device and sampling needle (148), and in that the carriage is movable between a sampling position, at which the piercing device pierces the tube bung and the sampling needle draws off a total specimen quantity, and at least one
25 distribution position at which the sampling needle expels the said total specimen quantity, or part thereof, into a receptacle such as a reagent vessel.

15. Device according to any of claims 1 to 14, characterised in that it
30 additionally includes a cassette loading station (14) and a cassette unloading station (16) placed respectively upstream and downstream of the transfer means (10).